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Before the  
**FEDERAL COMMUNICATIONS COMMISSION**  
 Washington, D.C. 20554

FEDERAL COMMUNICATIONS COMMISSION  
 OFFICE OF THE SECRETARY

In the Matter of )

)  
 Replacement of Part 90 by Part 88 to  
 Revise the Private Land Mobile Radio  
 Services and Modify the Policies  
 Governing Them )

PR Docket No. 92-235

To: The Commission

**Comments of PowerSpectrum, Inc.**

PowerSpectrum, Inc. ("PSI"), by its attorneys, hereby submits the following Comments in response to the Notice of Proposed Rule Making ("Notice") released by the Federal Communications Commission ("FCC" or "Commission") in the above-referenced proceeding.<sup>1/</sup> In its Notice, the Commission proposes a comprehensive revision of the FCC's rules affecting the private land mobile radio ("PLMR") services in order to increase channel capacity and promote spectrum efficiency in the frequency bands below 512 MHz and to simplify current policies governing use of these channels.

**I. INTRODUCTION**

PSI is a subsidiary of Geotek Industries, Inc. ("Geotek"), a U.S. public company. Geotek is involved in various segments of the telecommunications industry. Through its subsidiary, Bogen Communications, a 60-year-old communications company which Geotek

<sup>1/</sup> Notice of Proposed Rule Making, PR Docket No. 92-235, 7 FCC Rcd. 8105 (1992).

acquired in 1991, Geotek sells to a variety of participants in the industry, including AT&T, the Bell Operating Companies, and other major distributors in the U.S., Canada, and Europe.

In addition, PSI has entered into a joint venture with RAFAEL, which is the technology development arm of the Department of Defense of the State of Israel. Through this joint venture, PSI has obtained exclusive worldwide rights to commercial use of RAFAEL's advanced radio technologies. PSI is currently working to commercially implement one of these technologies, frequency hopping multiple access (FHMA) in the United States.

handoff. In fact, the system is indifferent as to whether the same frequencies are utilized in adjacent service areas. Third, an FHMA system is able to achieve full frequency reuse -- all frequencies can be reused in every coverage sector, cell, and microsite.

Another significant advantage of FHMA is that it employs voice activated DTO (Discontinued Transmit Operation). This feature is used to transmit only during active speech, thereby reducing the interference potential of each call. Finally, an FHMA system uses unique antenna technology which will allow for single frequency reuse over a large number of coverage sectors, without the need to divide a service area into cells, or to use different sets of frequencies.

FHMA is, therefore, an extraordinarily spectrum efficient system which will allow for a bundling of a wide array of applications and services, while supporting an extremely high number of users and networks simultaneously. For example, the technology can provide high quality voice, data, and other services to nearly 100,000 customers per market using only forty channels 12.5 kHz wide. Alternatively, a smaller number of customers could be provided with an even more expansive array of services on the same number of channels.

While PSI is currently working to employ FHMA technology in the 900 MHz band, the technology could also be utilized in the bands below 512 MHz with the same spectrum efficient benefits. Thus, PSI urges the Commission, in its efforts to improve the

utilization of channels designated for PLMR service, to adopt regulations which would encourage employment of such spectrum efficient technology.

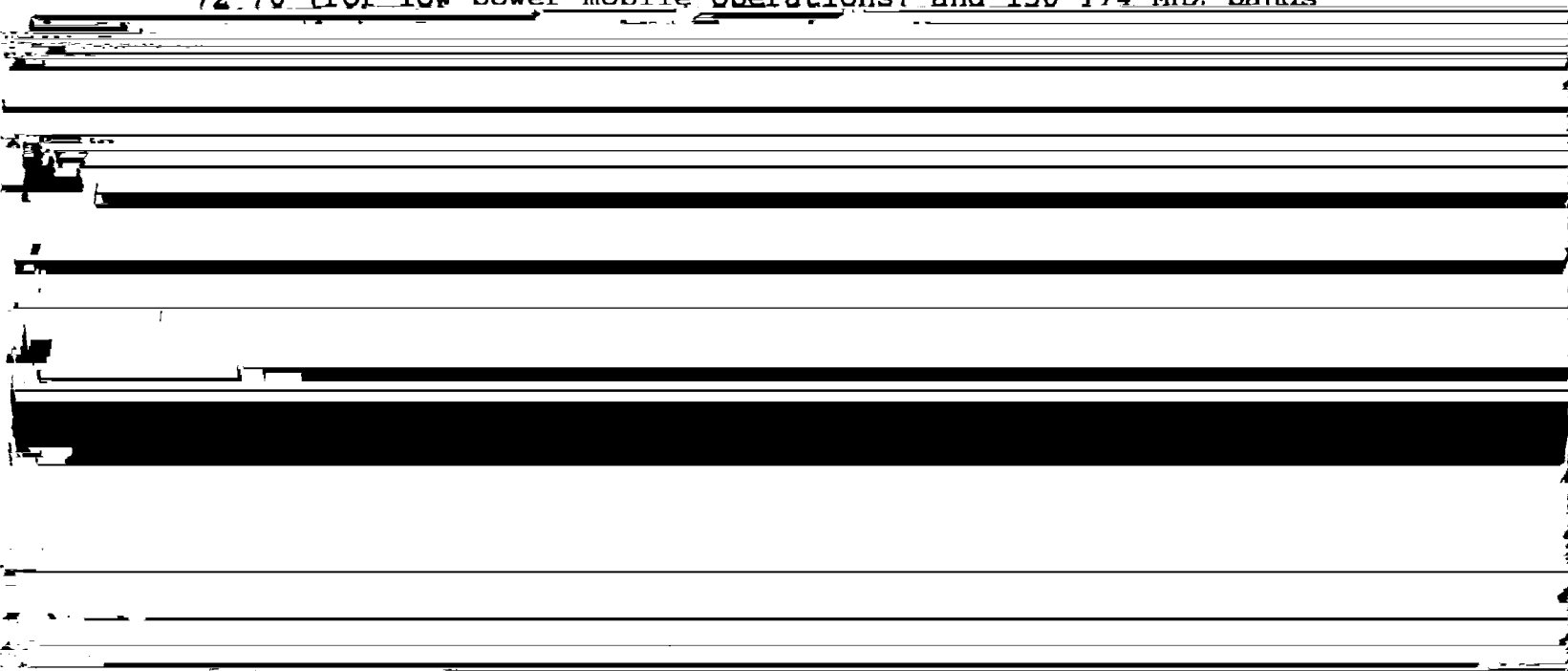
## II. DISCUSSION

### A. SPECTRUM EFFICIENCY STANDARDS

PSI strongly agrees with the fundamental intent and purpose of the Commission's Notice -- to improve spectrum efficiency and to develop a regulatory scheme that increases channel capacity for PLMR users. However, PSI believes that the Commission may have been too limited in its proposals for meeting these objectives, and cautions that the adoption of a regulatory scheme that envisions a specific spectrum efficient technology should not preclude or hinder other equally spectrum efficient options.

#### 1. Channel Spacing

The FCC proposes that services in the 421-430, 450-470, and 470-512 MHz bands move from the current 25 kHz channel spacing to 6.25 kHz spacing. In addition, it proposes that services in the 72-76 (for low power mobile operations) and 150-174 MHz bands



or hinderance of superior spectrum efficient technology which operates on a wider bandwidth.

For example, PSI's FHMA technology is extremely spectrum efficient and would certainly meet the Commission's objectives of increasing channel capacity for PLMR users while, at the same time, offer them superior voice, data, and other services. This technology cannot be used with a frequency pair using the narrower bandwidth proposed by the Commission in its Notice. Thus, adoption of the Commission's narrowband proposal, unless it permitted the employment of multiple assignments, would exclude the use of FHMA, and other similarly spectrum efficient technology, in the frequencies below 512 MHz.

PSI urges the Commission not to impose such limitations. Rather, it suggests that the Commission use the channel spacing proposed in the Notice as only a reference point for determining spectrum efficiency, while still allowing use of equally spectrum efficient technologies. Adoption of proposed Section 88.433, which allows for the use of non-standard bandwidths provided that such use is equally spectrum efficient, may accomplish this objective. However, it is unclear from the Notice how applicants will be able to demonstrate that a wider bandwidth is equally spectrally efficient.<sup>2/</sup> Certainly, if licensees must meet the

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<sup>2/</sup> Section 88.433, as proposed, gives specific deadlines for implementation of equally spectrum efficient technologies and, depending upon the frequency, the required communications link per bandwidth. It is unclear from the rules, as currently proposed, whether these deadlines are consistent with the transition periods imposed for  
(continued...)

traditional stringent waiver criteria, this would unduly restrict

~~the development of new quantum efficient technologies such as~~

Such a short time period is inadequate from both a manufacturer and user perspective. As discussed above, manufactures will need more time to design, produce and implement new technologies. Absent such additional time, there can be no guarantees regarding the effectiveness and reliability of the new equipment and both the manufacturers and users of the equipment would suffer. Further, adequate time is needed to allow for a smooth transition to the new technology without disruption to the current users.

#### B. CHANNEL EXCLUSIVITY

The Notice proposes allowing exclusive channel assignments in most of the bandwidths below 512 MHz. This would be achieved, in part, by an exclusive use overlay (EUO) plan which provides licensees with an opportunity to obtain exclusivity on currently shared channels. PSI generally supports this proposal. However, there are other options available which should not be excluded.

Licensees should be allowed to pool shared channels, as long as the utilization of the channels is at least as efficient as use of the channels individually.<sup>3/</sup> For example, pooling of channels utilizing FHMA is extremely efficient and does not require exclusivity because the radio transmitter hops between designated frequencies, and every burst of transmission is transmitted on a different frequency. By using FHMA and similar

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<sup>3/</sup> Similarly, channel stacking should be permitted if licensees can demonstrate that stacking their channels improves efficiency or is necessary for data transmission.

technologies, licensees can share the same channels without risk of interference or lack of privacy. In addition to being spectrum efficient, such shared-use can benefit both the users and providers of PLMR services. By pooling shared channels, licensees will have greater flexibility and will be able to provide an increased capacity and variety of services to the public. Through use of frequency hopping technologies, licensees can obtain such benefits while still maintaining a virtual private network. In addition, by using FHMA technology, communications can be secure and users can be assured of full privacy. Thus, although PSI does not object to channel exclusivity, the Commission should not foreclose the sharing of frequencies which, where the proper technology is used, can provide considerable public interest benefits.

#### C. CONSOLIDATION OF SERVICES

The FCC proposes to consolidate the PLMR services. PSI agrees with the Commission that the consolidation of current services is necessary. PSI believes that, in addition to alleviating current processing problems, consolidation of services will also allow for pooling of channels. As discussed above, PSI advocates the pooling of channels, provided that, as is the case with PSI's FHMA technology, it is spectrally efficient to do so. By consolidating the PLMR services, the Commission will more easily allow for such channel pooling and, thus, will encourage spectrum efficiency.



D. TECHNICAL AND OPERATIONAL CHANGES

1. Limitations on Effective Radiated Power

The FCC proposes reducing the standard limits on effective radiated power ("ERP") to 300 watts, with lower ERP limits for systems with antenna heights greater than sixty (60) meters above average terrain. While PSI does not specifically object to implementation of such a proposal in some circumstances, it cautions that adoption of such a restriction should not preclude the use of other spectrally efficient options.

PSI recommends that the allowed ERP be sufficient for geographical coverage of the area typically involving business activity of the licensee, with the minimum number of base stations necessary. By requiring a decrease in ERP, a licensee whose business justifies greater coverage will be forced to utilize more base stations than necessary. This would be a costly and wholly unnecessary expense which, in the long run, would only serve to harm users of PLMR services.

2. Innovative Use Bands

The FCC proposes to designate 258 channel pairs in the 150-162 MHz band for innovative, highly spectrum efficient radio systems. PSI does not object to this proposal. However, the use of innovative radio systems in these bands should not substitute for highly spectrum efficient technology such as PSI's FHMA system. The implementation of spectrum technology, and not the introduction of new radio systems, should be the FCC's primary goal.

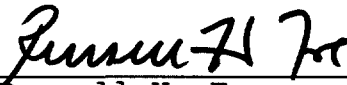
### III. CONCLUSION

PSI supports the Commission's goal of encouraging the use of more spectrum efficient technology. However, the proposals set forth in the Notice for accomplishing this objective are overly restrictive. For example, while the Commission's narrowband proposal is one option for the development of spectrum efficient system, it is not the only option and would preclude or restrict the use of other highly spectrum efficient technology, such as FHMA, which utilizes wider bandwidth. Thus, while PSI supports the Commission's goals, and does not specifically oppose the methods for achieving those objectives set forth in the Notice, PSI urges the Commission not to adopt such methods to the exclusion or hinderance of all other spectrally efficient options.

WHEREFORE, THE PREMISES CONSIDERED, PowerSpectrum, Inc. submits the foregoing Comments and urges the Commission to adopt regulations consistent with the views expressed herein.

Respectfully submitted,

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